EXECUTIVE SUMMARY

- In order to protect national parks for future generations, it is vital that the National Park Service (NPS) observes and understands the condition of natural resources in our parks. To address this need, NPS implemented a strategy known as “vital signs monitoring” to develop scientifically sound information on the status and long-term trends of park ecosystems and to determine how well current management practices are sustaining those ecosystems.

- National parks have been grouped into 32 vital signs networks linked by geographic similarities, common natural resources, and resource protection challenges. The network approach facilitates collaboration, information sharing, and economies of scale in natural resource monitoring. The approach also will provide parks with a “minimum infrastructure” to initiate natural resource monitoring.

- The Southwest Alaska Network (SWAN) includes five units of the National Park Service (NPS):
  1. Alagnak Wild River,
  2. Aniakchak National Monument and Preserve,
  3. Katmai National Park and Preserve,
  4. Kenai Fjords National Park, and
  5. Lake Clark National Park and Preserve.

  Collectively these units comprise 9.4 million acres, 11.6 percent of the land managed by the NPS, and 2 percent of the Alaska landmass. Network parks encompass climatic conditions, geologic features, near pristine ecosystems, natural biodiversity, freshwater, and marine resources equaled few places in North America.

- Initial planning efforts in the SWAN began in early 2002 with the staffing of a network coordinator and data manager and the formation of a board of directors and technical committee. During March through May 2002, the technical committee developed a strategy to breaking the three Phase I steps into manageable pieces that could be addressed sequentially. A key element of the strategy involved a series of mini-scoping workshops to develop preliminary objectives for monitoring and review and to discuss the current state of knowledge concerning park ecosystems and resource protection issues.

- Preparation for workshops involved “data mining” and literature synthesis, construction of conceptual ecosystem models, compilation of park resource protection issues, and identification of existing park monitoring efforts. Before and during workshops, participants reviewed and identified partnership opportunities and the monitoring efforts conducted by other federal and state agencies. Workshop summaries were compiled and circulated for technical review.

- This network of relatively untouched wilderness parks is a unique resource and offers unparalleled opportunities to learn about ecological systems minimally affected by humans. In recognition of this, the monitoring framework will emphasize:

a) establishing baseline reference conditions representing the current status of park and preserve ecosystems; and b) detecting and understanding changes through time.

- The network's conceptual foundation acknowledges that monitoring must address the interplay of multiple forces, which occur at a variety of spatial and temporal scales and that climate/landform, natural disturbance, biotic interactions, and human activities, are the most important drivers in determining ecosystem structure and function.

- The SWAN program is envisioned to be: a) ecologically based and issues oriented, with emphasis on assessing long-term and cumulative effects rather than short-term and isolated effects; and b) interdisciplinary, incorporating biology, hydrology, geomorphology, and landscape ecology and at multiple scales (e.g., coarser-grained network scale, and finer-grained park scale).

- The nature of SWAN parks is largely determined by the complex and dynamic physical, geological, and chemical inputs and interactions of marine, aquatic, and terrestrial subsystems. Therefore, a basic understanding of atmosphere-land-ocean interrelationships is important for us to comprehend how physical and biological drivers influence ecosystems.

- Climate influences on SWAN ecosystems are strongly tied to conditions in the North Pacific, especially location and strength of the Aleutian Low winter storm system, and the shift in storm track direction that occurs in summer. Various broader scale influences affect how these annual patterns play out in longer time scales. Climate drives the timing and amount of water entering SWAN ecosystems and is a determinant of fundamental properties of the ecosystems.

- Alaska ecosystems, especially those of Southwestern Alaska, are shaped and maintained by disturbances. Infrequent large-scale disturbances (volcanic eruptions, earthquakes, tsunamis) and more frequent smaller-scale disturbances (insect outbreaks, floods, and landslides) create and maintain a shifting mosaic of landscape patterns.

- Important biological interactions in the Southwest Alaska Network involve the transport of nutrients by mobile species, herbivore-predator interactions that maintain a heterogeneous distribution of resources, "ecosystem engineers" such as beavers and clams that structure habitats and influence the distribution and abundance of other species, and species such as the spruce bark beetle that create or modify disturbance regimes

- Ecological links between the coastal, freshwater, and terrestrial subsystems involve the flow of water, detritus, salmon, and bears. Salmon play an extremely important role in network ecosystems and provide a link between marine, terrestrial, and freshwater subsystems. Salmon are probably the most important biotic interaction affecting network ecosystems.

- Human activities acting as stressors in SWAN ecosystems stem from far-field influences related to global industrialization and near-field influences related to regional development and park visitation. The most important far-field influences are climate change, invasive species introductions, and effects on migratory fish and birds when they are not present in network parks. Near-field influences include a variety of activities, but all act in similar ways to affect fish and wildlife via disturbance, habitat loss or fragmentation, or over-harvesting.

- Candidate vital signs were chosen during a series of scoping workshops held between August 2002 and April 2003. The initial combined list that emerged from the scoping workshops contained 61 vital signs. This list was reduced to 38 after duplicate entries were removed, similar indicators were merged under a single vital sign, or weakly supported vital signs removed.

- Technical committee members reviewed each vital sign in the context of why it was selected, how it relates to conceptual ecosystem models, and how it contributes to the networks goals and objectives for monitoring. Committee members numerically ranked each of the vital signs based on ecological significance and relevance to park resource management and protection issues. The Board of directors reviewed the selection processs, rankings, and approved the draft list of vital signs in March 2004.